REMARKS

Election/Restrictions

The Examiner found that the application contains four inventions or groups of inventions and required election of a single invention to which the claims must be restricted: Group I (claims 1-10 and 13-15), Group II (claims 11-12), Group III (claims 16-35, 37-75, and 77-105), and Group IV (claims 36 and 76). Applicants confirm their election, without traverse, to prosecute the claims of Group I, claims 1-10 and 13-15.

Status of Application

Claims 1-10 and 13-15 are pending. Claims 11-12 and 16-105 have been withdrawn as directed to non-elected inventions. These claims have been cancelled without prejudice to their prosecution in other application(s).

Specification

The abstract of the disclosure has been objected to because of the usage of the word "said". Applicants have submitted a replacement abstract, where the word "said" has been replaced with "the".

Claim Rejections - - 35 U.S.C. § 112

Claim 13 has been rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The examiner found that the use of "platelet/fluoride-containing type alumina" is indefinite as to whether the forward slash represents an "and" or an "or" conjunction, and will be treated as "or" in connection with the examination. Applicants disagree with the Examiner's position with regard to claim 13 being indefinite. However, in the interest of facilitating prosecution, claim 13 has been amended and no longer uses the phrase "platelet/fluoride-containing type alumina".

Claim Rejections - - 35 U.S.C. § 102

Claims 1, 5-7, and 10 stand rejected under 35 U.S.C. § 102 (b) as being anticipated by Gerdes et al. (US 5,733,842). Applicants respectfully traverse this rejection.

The Examiner characterizes Gerdes et al. as reciting a method of preparing a catalyst carrier by "**impregnating** a preformed alpha-alumina carrier, which has been subjected to calcining and optionally, other preforming treatments, as part of a preforming process, with at

least one modifier selected from among alkali metal silicates and alkaline earth silicates. (Office Action at 6) According to the Examiner, Gerdes et al. also recites drying the impregnated carrier, and calcining it (where "firing" is synonymous with "calcining").

Applicants respectfully submit that the Examiner has mis-characterized the reference. Gerdes et al. teaches a method of preparing a carrier: the carrier is formed from certain ceramic components, an alkaline earth metal oxide, a silicon oxide, zirconium oxide, a liquid carrier medium, specified amounts of ceramic bond, lubricant and/or forming aids. The mixture is then shaped to form a carrier precursor. The precursor is then dried to remove the liquid carrier medium and the dried precursor is fired "**to form a carrier**" (see wording of Gerdes et al., claim 1, and specification at column 6, line 42 through col. 7, lines 59 (referring to carrier preparation)). The alkaline earth metal and silicon oxide compounds are thus added to the mixture **before the carrier is formed**.

Gerdes et al. itself distinguishes between the preparation of the carrier pre-cursor and the formed carrier and used the term "impregnation" to refer to a step after the carrier is formed. In col. 5, lines 28 through 38, Gerdes et al. teaches that "the catalyst carrier of the invention may comprise a number of other ceramic-forming components chosen to contribute to the desired physical properties, including crush strength and the like. For example components such as titania in an amount of up to about 5% by weight, are often found to confer particular advantage on such carrier materials. **The titania can be added as a component of the initial mixture or it can be added to the porous calcined carrier by impregnation using a titanium salt**" (emphasis added). Elsewhere, Gerdes et al. refers to impregnation as a step being used to prepare a catalyst on the carrier. (See "Catalyst Preparation" section, col. 7, line 61 through col. 8, line 19.)

Similarly, claim 1 of Gerdes et al. is directed to preparing a carrier, not deposition of a modifier on a preformed carrier which had undergone certain treatment. Gerdes et al. do not teach or disclose the production of ethylene oxide using a catalyst supported by a preformed carrier which has undergone certain treatment.

In summary, Gerdes et al. simply does not address treatment of the carrier with modifiers **after** the carrier has been formed.

In contrast, rejected Claims 1, 5-7, and 10 are directed to the treatment with a modifier of a preformed carrier or using the modified preformed carrier as a catalyst support. As set forth in paragraph [0019] of the present application, the expression "preformed alpha-alumina carrier" is to be understood as encompassing any material obtained by performing (on alumina or on a composition which comprises alumina) any sequence of treatments which includes at least one calcining, that is, the expression "preformed alpha-alumina

carrier" encompasses any of the many preformed alpha-alumina carrier materials which are commercially available.

It is established law that: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Thus, at least one element of claims 1, 5-7, and 10 is not found in Gerdes et al. and the claims are not anticipated.

Claim Rejections - - 35 U.S.C. § 103

Claims 2-3 and 13-15 are rejected under 35 U.S.C. § 103 as being unpatentable over Gerdes et al. as applied above, in view of Mikawa et al. (EP 1086743). Applicants respectfully traverse this rejection. As explained above, Gerdes et al. contains no disclosure or teaching regarding the treatment of a **preformed carrier** with a modifier. Further, the modifiers which Gerdes et al. teaches to add to the mixture prior to carrier formation are not modifiers selected from the group of sodium silicates, lithium silicates, and potassium silicates, or mixtures thereof, or a sodium silicate modifier with stoichiometry Na_2O-2.6SiO_2.

Mikawa et al. suffers from the same lack of relevance as Gerdes et al. Mikawa et al. describes in great detail the method of **making the carrier**, by mixing an alpha alumina with a particular sodium content with an aluminum compound, a silicon compound and a sodium compound, followed by calcination of the mixture. Mikawa refers to alpha-alumina powder having micron-scale particle diameters as the sodium containing alpha-alumina used to prepare the carriers. Further the examples in Mikawa et al. show the use of alpha-alumina having micron-scale particle diameters as a starting material. Other compounds are mixed into the starting material; the mixture is then extruded, dried, calcined, etc. Mikawa et al. does not describe or suggest treating a **preformed carrier** with a modifier. Thus, even assuming that one of skill in the art would perform the method of Gerdes et al. using the modifiers of Mikawa et al. (which applicants do not concede), one of skill in the art would still be adding the modifier to the mixture prior to carrier formation—not treating a preformed carrier. The washing step recited by the examiner in Mikawa et al. is a washing step after formation of the carrier. However, the washing step of Mikawa et al. is not conducted after treating a **preformed carrier** with a modifier, as set forth in claim 15 of the present application.

With regard to claims 13 and 14, Gerdes et al. also does not teach alpha-alumina carriers of platelet morphology. The sections of Gerdes et al. cited by the Examiner (column

5, lines 39-43) describe the various shapes into which the mixed material, prior to carrier formation, can be formed. After shaping, the material is dried and then calcined, where the alpha alumina particles are fused into a porous hard mass.

Similarly, in the present application, the preformed alpha alumina can be in several shapes, see paragraph [0021]. Rather than the shape of the formed material or carrier, the platelet morphology instead has to do with the structure of the alpha-alumina **particles.** As explained in the present specification at paragraph [00330, the preformed alpha alumina carrier "preferably includes **particles** each of which has at least one substantially flat major surface having a lamellate or platelet morphology".

The distinction between alpha alumina particles (i.e. powder) and alpha-alumina carriers (i.e. pills, pellets) is further made clear by Gerdes et al.'s teachings regarding desirable alpha-alumina particle sizes in the 1-120 micron range (column 3, lines 25-25 and lines 48-55) as compared to the dimensions of 5/16"x5/16" disclosed in Example 1 for the carrier precursor formed after mixing and extruding the component materials as hollow cylinders (column 7, lines 24-27).

The Examiner also cites Gerdes et al. as disclosing alumina at least 95 % by weight, a surface area of at least 0.5 m^2/g, and a pore volume of at least 0.5 cc/g. The Examiner relies upon Mikawa et al. to disclose a median pore diameter between 1 and 25 microns. At least the pore volume disclosed by Gerdes et al. is not co-extensive with the pore volume claimed in the present application. Further, Claim 3 of Mikawa et al. provides only an average diameter of 0.3 to 3.5 microns, and thus clearly does not supply the missing property. Further, the Examiner has made no showing that the **combination** of properties recited in present claim 13 are found in Gerdes et al. and Mikawa et al. or the combination of such references, even if such references are properly combined.

Claim 4 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over Gerdes et al. as applied above to claims 1, 5-7, and 10 above, and further in view of US Patent No. 6,103,916 by Takada et al. Applicants respectfully traverse this rejection. As explained above, Gerdes et al. contains no disclosure or teaching regarding the treatment of a **preformed carrier** with a modifier. In contrast, Takada et al. does discuss the treatment of a preformed carrier. The treatment described in Takada is that the carrier is washed with water; boiling water is described in Examples 1, 2, and 3. More specifically, the washing treatment yields a wash exhibiting a resistivity index of not less than 10,000 Ω-cm. In col. 4, lines 15-18, Takada states that "the washing with water mentioned above may be preceded by the washing with an aqueous solution of an inorganic acid, such as, for example, nitric acid or an organic solvent such as, for example, alcohol." Nothing in Takada describes or

discloses treating a preformed carrier with a modifier selected from among alkali metal silicates and alkaline earth metal silicates.

The Examiner's reliance on Takada as teaching drying following impregnation is also misplaced. In claim 8, Takada is referring to drying a carrier which has been impregnated with a silver salt and amine type complex (to make a catalyst). The carrier which has been used for the impregnation by the silver solution had previously undergone the water treatment. Claim 8 is not directed to drying the preformed carrier after it has been treated with a modifier as claimed in the present invention.

Finally, claims 8 and 9 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Gerdes et al. as applied above in view of Thorsteinson (EP 0480537). As explained above, Gerdes et al. contains no disclosure or teaching regarding the treatment of a **preformed carrier** with a modifier. Neither does Thorsteinson. While Thorsteinson describes catalysts which use certain efficiency enhancing promoters, Thorsteinson does not teach or suggest the combination of such promoters on catalysts which use preformed carriers which have been subjected to a treatment as claimed in the present invention.

Applicants respectfully requests reconsideration of the rejection of claims 1-10 and 13-15 and further submit that claims 1-10 and 13-15 are in condition for allowance.

Respectfully submitted,

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